§13. Radial Structure of the Burst Mode Measured by Soft X-ray Detector Array System

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Burst mode is a global mode observed in a low β plasma ($\beta \leq 0.5$ %) with co-injected NBI beam heating. Burst of magnetic fluctuations with an interval of several ms is the distinctive feature of burst mode(Fig.1). Though the preceding studies show that the ideal/resistive interchange mode is the candidate from poloidal mode analyses[1], the detailed radial structure of the modes has not been clarified.

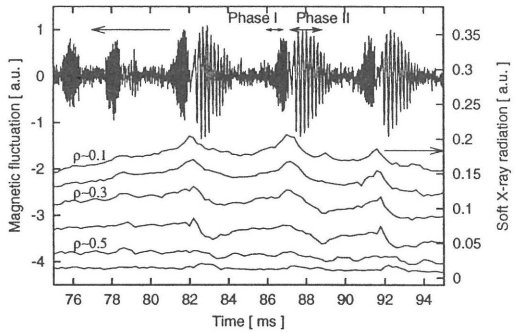

Fig.1 Typical time evolution of burst modes.

Linear array of high-speed(~200kHz) PIN photodiode was installed on a port of CHS recently [2]. The resolution of lines-of-sights Δr is~15mm at the equatorial plane.

The summary of the new findings about the burst modes with this system is the following; (1) A sawtooth-like crash occurs when the mode is switched from phase I to phase II. (2) The inversion radius is about 0.5. However, by considering the line integral effect, inversion position is $\rho \sim 0.6$ where $\iota = 1/2$. (3) In phase I, the fluctuations amplitude is localized in the narrow region($0.1 \leq \rho \leq 0.4$, outboard side of the magnetic axis(Fig.2(a)).). (4) In phase II, the fluctuations are observed near the $\iota = 1/2$ surface(Fig.2(b)).

All of these characteristics may not be explained by a simple model. However, the enhancement of fast ion loss with the burst mode and the movement of peak of the magnetic axis(measured by SX array) during the mode suggest the relation between fast ions and MHD modes. We will continue the study changing the conditions, such as the incident angle of NBI which will modify the density profile of the fast ions.

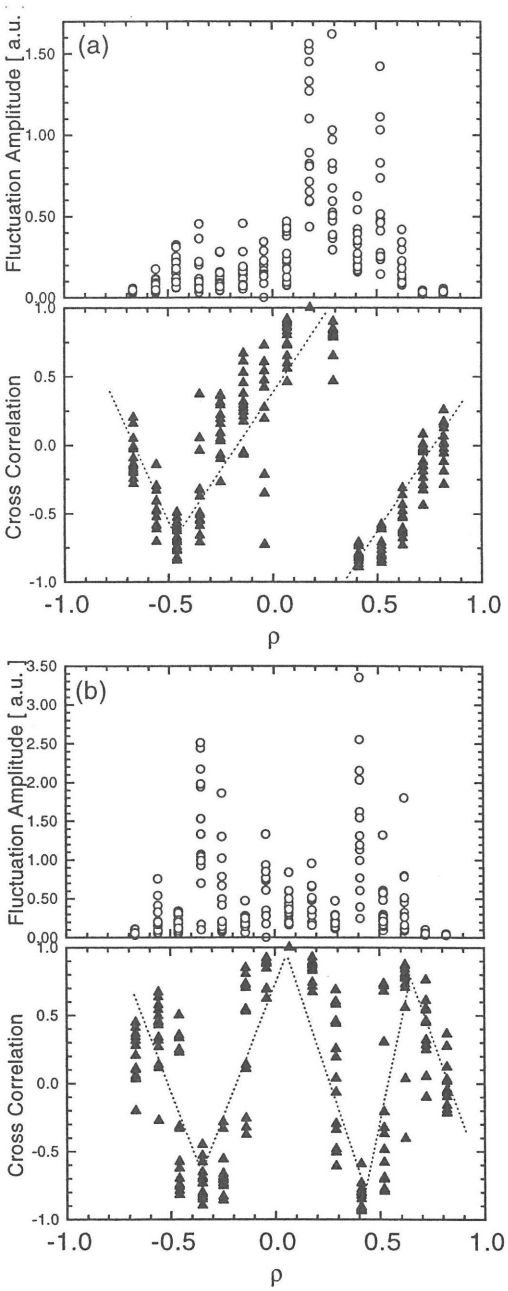

Fig.2: Profiles of the amplitude and the cross phase of the fluctuation(Phase I :(a), Phase II:(b)).

References

1) S. Sakakibara, *et al.* , J. Phys. Soc. Japan, **63**(1994)4406
2) S. Ohdachi, *et al.* , Proceeding of 24th International Conference on Controlled Fusion and Plasma Physyics in Betchtesgarden, to be published